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# SCIENCE NEWSLETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



January 14, 1939

It Talks

See Page 19

A SCIENCE SERVICE PUBLICATION

# Do You Know?

A new British organization is the London Scientific Film Society, which holds shows of scientific films for its members and guests.

S's are now as important as the 3 R's in education, says a New York educator, stressing need for teaching science and the social studies.

About 400 dogs a year, imported into England as pets, are put through a six-months quarantine regime to prevent spread of diseases.

The American Bison Society, founded in 1905, is considering a memorial to the bison in the heart of the old buffalo country, in Nebraska.

If the French birthrate continues its downward curve, the population of France will drop from 40 million to 28 million in fifty years.

The Amazon fly has been introduced successfully into British Guiana to fight the destructive sugarcane borer, and is now being tried in Puerto Rico.

The University of California has a new flea laboratory, where fleas will enjoy air conditioning while scientists study the flea's role in carrying sylvatic plague.

Fossil prints of slanting raindrops that marked the earth during a northeast gale in Colorado 250 million years ago are on exhibit at Chicago's Field Museum.

## SCIENCE NEWS LETTER

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*Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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What warning may make it possible to predict earthquakes? p. 22.

There are no snakes in New Zealand.

Evidence of man's presence in European Russia in the Old Stone Age has been reported from discoveries at over 100 sites.

Weather insurance, to insure crops carried on sailing vessels to distant ports, was used as long ago as the thirteenth century.

Hairless animals are reproduced realistically for museum exhibits by replacing the skin with a celluloid compound, and the same process has been successfully used for a hairy orang-utan.

Government scientists are working on a method of converting the lactic acid in milk into acrylic acid which is useful in making transparent plastics that can be substituted for glass.

zines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

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ENGINEERING

# Now a Machine That Talks With the Voice of Man

**Voder Combines Electrical Currents to Produce Synthetic Speech; Converses at Signal From Keys**

See Front Cover

NATURE took hundreds of thousands of years to teach man how to speak. In two years, scientists have taught a machine how to talk, translating into real words and sentences signals punched into its controlling keyboard.

Controlled by a skilled operator who has learned how to mix the sounds the device's two electric discharge tubes produce, it combines varying electric currents that an amplifier turns into real speech. No phonograph records of any kind are ever used. It is the first device that actually creates human speech.

The name of this new robot is the Voder.

"Practice makes perfect," it told its first enthusiastic hearers at its debut before the Franklin Institute. It isn't perfect yet. But the Voder was good enough to convince its audience that the Fourth of July orators and, perhaps, even opera singers may some day have to look to their laurels.

This new synthetic orator will "lecture" with his "electrical accent" at the New York and San Francisco world fairs.

It is a compact machine resting on a small table, plus as many loudspeakers as are necessary to reach the audience. It has a pair of keyboard units, more than a dozen other controls and an electrical circuit featuring a vacuum tube and a gas-filled discharge tube.

It builds up speech from 22 fundamental sounds from which speech organs also create spoken words. The operator, in using the device, analyzes phonetically the words the machine is to speak, then duplicates the sounds, and therefore the words, by pressing the proper keys and controls.

The Voder proved itself to be quite an able talker at the hands of Mrs. Helen Harper of New York, first of 24 telephone operators to be trained in its use, and S. S. A. Watkins, Bell Telephone Laboratories scientist who taught it to speak. When members of the audience suggested even such difficult foreign phrases as "Hasenpfeffer" and "Com-

ment allez-vous?" it repeated "Hasenpfeffer" and "Comment allez-vous?" with perfect aplomb.

The machine resulted from efforts of Bell scientists H. W. Dudley and R. R. Riesz in fundamental telephone research. They developed an electrical speech analyzer and a speech synthesizer, both of which were demonstrated at the Harvard Tercentenary. The former machine fed an electrical control pattern into the synthesizer. With the exception of the organ-like keyboard, all its parts are in regular telephone use.

When the subject of the Bell exhibit at the New York and San Francisco fairs came up, it was suggested that the machine that talked, when the analyzer fed it the proper pattern, would be a fit display—particularly if it could be made to speak when an operator punched a keyboard instead of merely seeing that the analyzer continued feeding it the proper signals.

Two fundamental types of sound are involved in human speech—the relatively musical note of the vocal cords, and a sibilant hiss which can be recognized most easily in a whisper. These sounds the machine imitates. The vocal sound comes from a vacuum tube, while the sibilant is produced in a gas-filled tube. The tubes themselves do not actually produce the sounds; what they do is produce an electric wave whose pattern corresponds to the sounds in question and which is converted into sound in an amplifier, just as occurs in a radio receiver.

These two fundamental sounds are given proper pitch by punching the right one or ones of 10 keys which control electric filters. Changes in intonation, as in asking a question, are made by raising or lowering a foot pedal. Three special tabs provide the "stop" consonants, "t", "p", etc.

The Voder is actually the superior of any human being alive in one respect, for it can speak in tones ranging from lowest bass to highest soprano, as determined by the flick of a knob. Ordinarily, however, it speaks in a firmly masculine baritone.



**THE VODER**

*The young lady striking keys is creating a man-like voice. This and the cover picture are from the Bell Telephone Laboratories.*

Mr. Riesz is also known for his work in connection with the development of the artificial larynx. He and his associates are accustomed to calling the Voder "Pedro" after the Brazilian emperor, Dom Pedro. Dom Pedro, when he listened to a demonstration telephone, then newly invented, at the Centennial Exposition in 1876, exclaimed, "My God! It talks!"

Heart of the device is a "relaxation oscillator," which produces a saw-toothed wave from the discharge tubes, instead of the rounded wave of a pure musical note. The machine has considerable difficulty with the so-called transitional consonants, such as "l" and "r", but otherwise its speech is clear.

Science News Letter, January 14, 1939

GEOLOGY—PHYSICS

## Research By-Product Saved \$500,000 During Depression

HERE is nothing much more fundamental than the constitution of the earth itself and the rocks that lie beneath our collective feet. In Washington there is a modest building full of laboratories where a handful of scientists are struggling with this problem.

During the World War the scientists at the Carnegie Institution's Geophysical Laboratory interrupted their program long enough to help create an American optical glass industry without which our

military forces would be blind. Then they went back to fundamental research.

One of the researchers there was Dr. R. B. Sosman. About a decade ago he was persuaded to join the research laboratory of U. S. Steel Corporation then being organized under Dr. John Johnston, Director of Research, and former Sterling Professor of Chemistry at Yale. The steel industry as well as the pure science foundation, with steel-earned Carnegie funds, needed a man who knew about quartz and silica. For this is stuff that withstands the heat of furnaces. It is axiomatic in research that it is wisest to do a thorough, fundamental job of "pure science" knowledge manufacture. The by-products will pay industrial dividends in the near future and the pure science main product may produce a new industry a few decades hence.

One of the mere by-products earned the cost of Dr. Sosman's researches a

good many times over during the depression. You'll remember that steel production dropped then. That meant less need for coke and that caused a shutdown of by-product coke ovens. But it cost money to keep an oven shut down, or at least it used to. The ovens are lined with silica brick, which when cooled has a large volume change, so large that it wrecks the lining. The practice had been to preserve the ovens by firing them with gas, though they were idle and useless.

Dr. Sosman heard about this and remembered his researches on transition points in silica. He was able to predict that if the ovens were cooled very, very slowly in the range 400 to 500 degrees Fahrenheit the disastrous volume change could be avoided. The idea worked perfectly and while the ovens were shut down for three to four years about \$500,000 in gas bills was saved.

*Science News Letter, January 14, 1939*

#### BIOLOGY

## Plant Tissues Shown to Have Potential Immortality

### Plant Callus Grows and Grows in Laboratory, But Its Cells Remain Immortally Young and Undeveloped

YOUNG plant tissue has shown potential ability to stay young forever, in cultures prepared by Dr. Philip R. White of the Rockefeller Institute for Medical Research, Princeton, N. J. Dr. White, who was winner of the \$1,000 prize of the American Association for the Advancement of Science a year ago, reported his newest researches before the same organization, at the recent Richmond meeting.

The living material used in the experiments was taken from a hybrid ornamental Nicotiana plant, and consisted of stuff called callus. Plant callus is a mass of undifferentiated, unspecialized cells that form when the plant is wounded; it is essentially embryonic, or physiologically young tissue.

Dr. White kept his bits of callus in specially prepared nutrient solution consisting of a sugar, certain necessary mineral salts, together with vitamins and plant hormones which have been found essential to growth. The tissue grew and grew, but the cells showed almost no tendency to mature into any of the specialized forms found in plant organs. It was immortally young.

Each week Dr. White discarded part of the growth and kept the rest. At the end of the week new growth would have increased the pieces to three times their original size.

This kept up for forty weeks. By that time, he calculated, had he been able to keep all of the tissue as it grew, the original piece would have increased to 10 to the 19th power (10,000,000,000,000,000) times its original size.

For several years, Dr. White has kept cultures of roots going, unattached to any parent plant, but this is the first time that it has been possible for him to produce unspecialized tissue that is "just plant." The new material is analogous to the cultures of chick embryo, long since famous in the scientific world, first prepared many years ago by Dr. Alexis Carrel.

### Evolution in Non-Living

EVOLUTION of man and all lesser living things gains scope and takes on new grandeur by being traced far below the world of life to the very chemical elements themselves.

A new visualization presented by Prof. George A. Baitsell, of Yale's department of zoology, bridges the gap between the living and the non-living with recent new knowledge of gigantic chemical molecules of viruses that act as though they were alive.

The difference between the living and the non-living is shown to be a matter of complexity. The same materials are used in both domains and they conform to the same elemental patterns. The natural world is fused so effectively that the procession of organic development flows uninterruptedly from atom to man. There is no need to worry as to just when and at exactly what stage life was infused into the evolving stuff of the natural world. In that ultra-Lilliputian borderland where the most powerful microscopes lose their sight, increasing complexity evolves into what has been labeled "life."

"From the simplest substances in the organic world to the most complex patterns of living substance there must be a graded series," Prof. Baitsell told the scientists. "Should evolution begin at the level of the living organism? The union of hydrogen and oxygen to form water, the union of carbon and oxygen to form carbon dioxide, the union of water and carbon dioxide to form sugar, the addition of other elements to the sugar molecule to form protein—were not all these stages in the evolutionary processes which have led to ever-increasing complexity, reaching their climax in the world of life?"

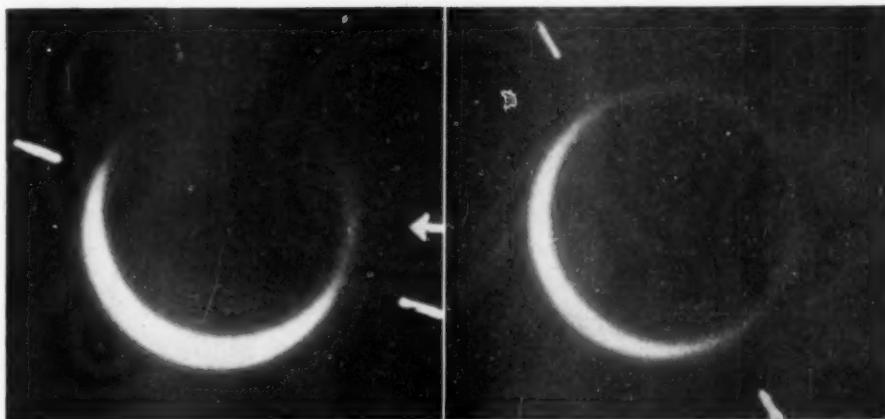
### Viruses Living?

ONE of the major controversies of science today may be settled with the verdict: Everyone right.

The viruses that cause diseases like smallpox, infantile paralysis and other diseases are living? Correct. They are non-living? Correct. They are the beginnings of life? Yes. They are the last possible stage in parasitic degeneration? Also yes.

Contradictory as this may sound, it may be the explanation of the findings in this latest field of disease research, in which protein molecules, exceedingly minute for germs and exceedingly large chemically, are the puzzling actors.

One of the leading researchers in this field, Dr. Thomas M. Rivers of the Rockefeller Institute for Medical Research, believes that these viruses, much too small to see, are a very "mixed lot," having only their size and disease-causing ability in com- (Turn to Page 28)



BRIGHTNESS FROM DUST

*Here are the first photographs of Venus showing a glowing ring of light visible around the entire circumference of the planet. These pictures were obtained at Lowell Observatory at Flagstaff, Ariz. by Drs. E. C. Slipher and James B. Edson during the recent inferior conjunction of the planet, late in November. The white lines indicate the position angles of the line joining the cusps of the sunlit crescent. The arrow points to a cloud.*

## ASTRONOMY

## Our Milky Way Extends For 60,000 Light Years

### Most Distant Objects in Our Own Island Universe Are Farther Away Than Are Neighboring Galaxies

A NEW measurement of the dimensions of our own island universe, the Milky Way, was presented to the American Astronomical Society at New York by Dr. Harlow Shapley, director of Harvard Observatory.

By study of the useful cluster-type Cepheid variable stars, whose distances can be readily determined, Dr. Shapley found that the globe of stars surrounding the dense disk of the Milky way is more than 60,000 light years thick.

The most distant objects of this globe are farther away than the Magellanic Clouds, our satellite galaxy neighbors, Dr. Shapley said. "Thus, these external systems may, in a tenuous way, be said to lie within the globe of stars that constitute the outer fringes of the Milky Way."

Probably 95 per cent. of all known stars, whether variable or not, are within a thousand light years of the Milky Way plane, Dr. Shapley said. But the observed cluster-type variables extend outward from that plane to distances of 50,000 light years or more.

Evidence that the extremely distant Cepheids are part of the Milky Way

system lies in the fact that the "population density" of these stars, or the average number of stars per unit volume of space, falls off rapidly at greater distances from the Milky Way.

At a distance of 30,000 light years from the plane the density is about one-thousandth of that near the plane, Dr. Shapley said. Clearly then, the stars are members of our system, and do not represent a random distribution of stars through space.

Dr. Shapley studied the several hundred cluster-type Cepheid variable stars lying in the high galactic latitudes, that is, quite far from the Milky Way plane, and free from the low-lying absorbing clouds which make measurement of distances difficult. Most of the high latitude stars were found in surveys of faint variables carried on at Harvard Observatory.

### Glow of Venus

THE BRILLIANT planet Venus owes its luminous splendor in the night sky to an atmosphere of tiny dust particles which scatter sunlight much more effec-

tively than do the air molecules of the earth's atmosphere.

This tentative conclusion was advanced by the Lowell Observatory scientists, Drs. E. C. Slipher and James B. Edson.

Taking more than 500 pictures of Venus over a period of eight days late in November, when the planet was at its nearest approach to the sun, the Lowell astronomers have photographed an entire ring of light extending around the planet when it was in its crescent phase like that of the moon at first or last quarter.

"Photometric measurements gave the ratio of brightness of the Venus twilight extensions to the brightness of our adjacent sky," reported the astronomers.

"Assuming the effective height of the Venus atmosphere as two miles, the brightness of the twilight extensions in the neighborhood of the theoretical cusps is between 35 to 40 times the brightness of our sky near the sun. Since the brightness of our sky in this region is probably about 4,000 lamberts, the brightness of the Venus atmosphere viewed tangentially appears to average more than 100,000 lamberts."

This extreme brightness appears to be due to fine dust particles scattered through the gaseous atmosphere of Venus, the astronomers explained. Observations through spectrosopes have never revealed the presence of water vapor in the atmosphere of the planet. Such water vapor particles would be the next most likely source of light scattering which could account for the amazing sky brilliance on the planet.

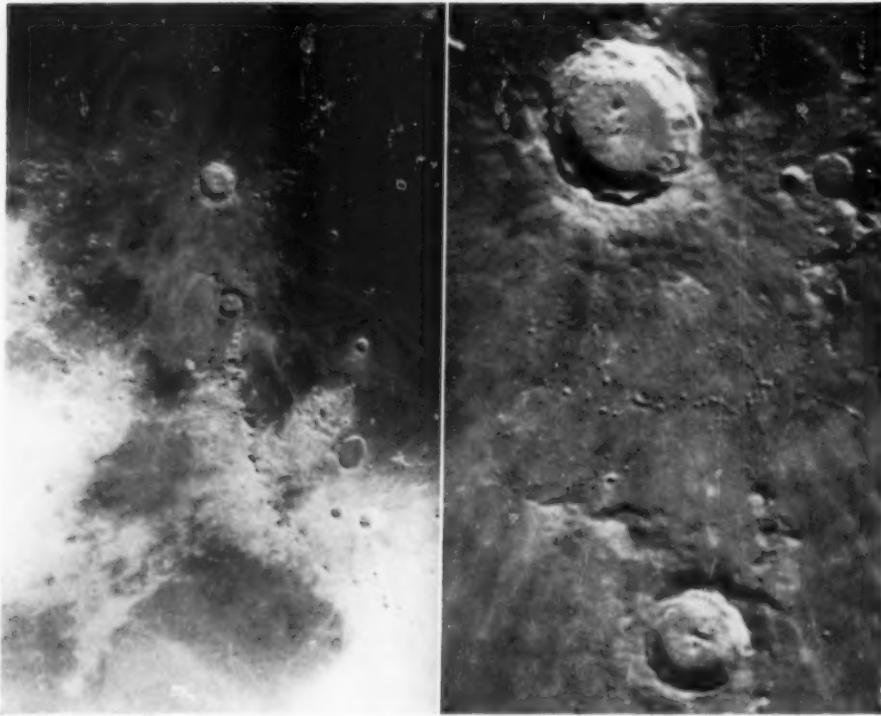
The actual surface of Venus, Drs. Slipher and Edson noted, is never seen because of the overlying dust-filled atmosphere with its light-scattering properties.

### "Atomic Governor" in Sun

A NEW theory of radiation pressure in the solar atmosphere explaining the motions of the great flaming prominences which are projected thousands of miles into space from the sun, was presented by Dr. Donald H. Menzel, Harvard astronomer.

A strange atomic "governor," Dr. Menzel stated, may control the speeds at which the giant flames are shot into space.

Apparently defying the laws of gravity, the prominences have been observed to move with uniform velocities. Whether spouting out or falling back, a flame moves for a period at one speed, then



#### PHOTOGRAPHY LIMITS ASTRONOMY

*Ability of telescopes to reveal the detail of heavenly objects is limited by the grain of photographic plates. The photograph of the moon at the left is clear and sharp, but when greater magnification is attempted as in the section shown on the right, the result is fuzzy on ordinary photographic plates.*

suddenly may accelerate or decelerate, and then moves for a while at the new speed. The best observations of this phenomenon have been made by Dr. Edison Pettit, of Mount Wilson Observatory, who has recently been collaborating with Dr. Robert McMath at the McMath-Hulbert Observatory in Michigan.

By the Menzel theory for the first time the peculiar speed characteristics and levitation effect may be explained in terms of radiation pressure alone, without conjecture as to possible action of other forces, magnetic or electrical.

As is well known, light impinging on any substance, will exert a pressure, provided the energy is absorbed. The atoms of the solar atmosphere are singularly transparent to light of most colors. But in the far ultraviolet are found strong absorptions arising from the element hydrogen. According to Dr. Menzel's theory, if, in addition, there are bright emissions of hydrogen light, the solar hydrogen atoms suddenly impelled up or down by excess pressures are subjected to a control which tends to equalize the gravity and radiation pressures, or in other words to make the new velocity constant.

The controlling bright hydrogen emission line would probably possess a dark absorption line running through its center, Dr. Menzel said.

If the energy for the prominence movements originates from such a source, then by the Doppler effect the steady speeds of the atoms can be explained. An atom subjected to excess radiation pressure will be accelerated and will absorb in the "wing" of the emission line, where the radiation pressure is diminished; conversely, an atom subjected to excess gravity pressure will tend to move into an energy range where the radiation pressure is increased.

Because the earth's atmosphere is opaque to these radiations, we cannot observe them directly, but only infer their existence from studies of the sun's atmosphere.

A temperature in the sun of from 12,000 to 15,000 degrees Centigrade would be required to supply the ultraviolet radiation pressure necessary to control the prominences, as visualized in this theory, Dr. Menzel said. There have been recent observations tending to confirm such a high temperature, although past estimates have ranged as low as 6,000 degrees.

Dr. Menzel pointed out that an earlier theory of solar prominence energy proposed by Dr. E. A. Milne, British scientist, where the supporting radiation was assumed to arise from an absorption instead of an emission line, led to calculations of steadily increasing speeds of atoms subjected to excess pressures. These calculations do not agree with observations of prominence behavior, Dr. Menzel said.

#### Grain Size Limits

**T**HE GRAININESS of photographic plates is a limiting factor of the ability of telescopes to resolve the detail of stellar and planetary objects, Dr. Keivin Burns of the Allegheny Observatory, Pittsburgh, Pa., reported.

For telescopes having aperture F18 (focal length 18 times the diameter of the aperture of the telescope) the full resolving power of the instrument will separate detail of objects only 100th of a millimeter. Ordinary process plates are too coarse in graininess to obtain this limit, Dr. Burns said. However, new special plates of finer grain are now available which will just do the job.

*Science News Letter, January 14, 1939*

#### SEISMOLOGY

#### Changes in Gravity May Warn of Earthquake

**C**HANGES in the force of gravity, hitherto supposed to be constant at any one point, may provide scientists with a means of warning of imminent earthquakes.

This possibility of predicting the frequently destructive movements of the earth's crust was advanced before the Geological Society of America by Prof. George W. Bain of Amherst College.

"Compression precedes the violent expansion and results from active and essentially continuous earth movement," Prof. Bain explained in describing occurrences preceding and accompanying earthquakes.

"While compression is increasing, rock compressibility must be diminishing and rock density and likewise the force of gravity must be increasing. The magnitude of the change in either compressibility or the force of gravity indicates the earthquake imminence," he declared.

Scientists can measure these changes in the force of gravity, he pointed out.

*Science News Letter, January 14, 1939*

An epidemic of cholera in northern India recently took 17,000 lives.

## GENERAL SCIENCE

# Scientists Organize to Study Social Aspects of Science

**American Association of Scientific Workers, Like British Group, Wants Better Use of Science Research**

**A** NEW kind of scientific society oriented toward economic action is in the making.

It is the American Association of Scientific Workers, born of spontaneous organization efforts in Philadelphia and Cambridge, Mass. Plans are being perfected to multiply these two pioneering sections and to bring into the new association scientists in all parts of the nation.

Bringing scientific workers together to promote an understanding of the relationship between science and social problems is the primary objective of the AASW. It is planned to organize and express opinions on steps to be taken toward the solution of such problems, and to promote all possible action on the conclusions achieved.

The American Association of Scientific Workers parallels closely the Association of Scientific Workers organized in Great Britain in 1918.

Sir F. Gowland Hopkins, Nobelist and world-famous authority on the vitamins, has already given his support to the AASW, speaking as president of the British ASW:

"In these days when science plays so great a part in every field of modern life it is essential for scientific workers to organize, both to protect their own economic and professional status and to work for the better organization and application of science for the benefit of the community. These problems are not confined to one country, and the ASW welcomes the formation of a brother organization in America."

In the original list of sponsors for the AASW are such science leaders as: Dr. Harold C. Urey, Columbia University Nobelist in chemistry, Prof. A. J. Carlson of the University of Chicago; Prof. Robert Chambers of New York University; Dr. A. C. Ivy of Northwestern University; Dr. Leo Loeb of Washington University; Prof. J. R. Oppenheimer of the University of California; Prof. Henry E. Sigerist of Johns Hopkins, and Dr. Edward C. Tolman of the University of California.

Organization is in the hands of Donald Horton of Philadelphia, corresponding secretary, and Dr. Kenneth V. Thimann of Harvard's Biological Laboratories.

*Science News Letter, January 14, 1939*

## GENERAL SCIENCE

# Pupils Kept in Ignorance Of Facts of Life Sciences

**S**CHOOL boys and girls of America are kept in ignorance of the basic facts of man's origin and destiny through a fundamental lack of freedom of thought in our schools.

This was the serious charge made by Dr. Oscar Riddle of the Carnegie Institution's biology laboratories at Cold Spring Harbor, N. Y., in his presidential address before the National Association of Biology Teachers.

"Our schools turn out a generation of minds dulled to the best of science," said Dr. Riddle, "though that genera-

tion must live in an age shaped by science and though that generation is called upon to make momentous decisions on the complex social adjustments imposed by application of scientific discovery.

"Except perhaps for a little while in ancient and magnificent Greece, no one has yet had opportunity to see a single generation of human beings develop without the repressing influences on free inquiry which religious tradition throws around the basic problems of the life sciences."

It is politically important that all shall know that all men, except identical twins, are created not equal but unequal, Dr. Riddle declared. It is important, he urged, to have this fact assimilated and well known by the public at large in order that democracies may avoid the unreason and the extremes that may destroy them.

No optimum of future man is thinkable without some selection and control of those permitted to live or of those permitted to reproduce, Dr. Riddle declared. Men may as well make up their minds "that neither magic, tea-leaf reading nor prayer will suffice for checking the physical degeneration of the race."

Praising newspapers that publish scientific news and interpretations, Dr. Riddle nevertheless pointed out that 256 American newspapers carry astrological services to cater to the people's uneducated appetite for myth and magic.

"Men now begin to feel that we are entering a socially-minded age" Dr. Riddle conceded, "but only a few begin to see and say that democracies may obtain more of chaos than of comfort if their peoples are left unacquainted with realities and with the forces of impelling social change.

"Only dictatorships can blacken out the sphere of reason and still avoid chaos. Indeed, the very principle of democracy is already in the midst of a grim and cruel struggle for survival. Yet our educational programs nowhere now support freedom and democracy as civilization itself demands."

*Science News Letter, January 14, 1939*

## MEDICINE

## Cancer Less Common Among Women With Large Families

**C**ANCER appears to be slightly less common an occurrence among women who have had many children than among women with few children, Dr. Herbert L. Lombard of the Massachusetts Department of Health told the American Statistical Association.

This greater tendency on the part of women with small families to develop cancer is probably linked with biological inferiority and their relative inability to have large families, Dr. Lombard indicated.

Studying a possible link between cancer and heredity, Dr. Lombard found that the difference in occurrence of the dread disease between individuals whose parents had the disease and those who did not "is so slight as to be almost negligible."

*Science News Letter, January 14, 1939*

## ANTHROPOLOGY

**Anthropologists Decry Racial Discrimination**

**A**MERICA's group of scientists who specialize in study of man and who speak with authority on the world's races has gone on record to denounce sharply misuse of anthropology—science of man—by "many countries" bent on unscientific racism.

Expressing its views in a resolution, the American Anthropological Association at its annual meeting declared:

"The terms 'Aryan' and 'Semitic' have no racial significance whatever. They simply denote linguistic families."

The resolution also states:

"Race involves the inheritance of similar physical variations by large groups of mankind, but its psychological and cultural principles, if they exist, have not been ascertained by science."

As a third and closing declaration the resolution said:

"Anthropology provides no scientific basis for discrimination against any people on the ground of racial inferiority, religious affiliation, or linguistic heritage."

A Canadian scientist, Dr. Diamond Jenness of the National Museum at Ottawa, was elected president of the association for 1939.

*Science News Letter, January 14, 1939*

## MEDICINE

**Sulfanilamide's Action Due to Hydrogen Peroxide**

**H**YDROGEN PEROXIDE, long a stand-by in home treatment for cuts, now appears to be the substance to which sulfanilamide, new chemical remedy for a host of diseases, owes its effect.

Studies revealing the part played by hydrogen peroxide in sulfanilamide treatment, at least in pneumonia and streptococcus infection, were reported by Drs. Arthur Locke, E. R. Main and R. R. Mellon, of the Western Pennsylvania Hospital. (*Science*, Dec. 30).

The pneumonia germ and the deadly hemolytic streptococcus both have the property of producing hydrogen peroxide, the Pittsburgh scientists point out. But both these germs are sensitive to peroxide injury, and neither of them can prevent accumulation of the peroxide they can produce.

In order to grow, these two deadly germs depend on the enzyme, catalase, to get rid of the peroxide they produce.

Catalase, which decomposes hydrogen peroxide, is present in many plant and animal tissues. The enzyme is made inactive, however, by the chemical, hydroxylamine, and by substances related to it.

When dilute solutions of sulfanilamide are exposed to ultraviolet rays, the Pittsburgh scientists found, substances are produced which are like hydroxylamine in their anti-catalase effect. Such substances should be as easily made, they state, from sulfanilamide by chemical action of the peroxide produced by pneumonia germs and streptococci. The result would be an accumulation of anti-catalase substances and a consequent accumulation of hydrogen peroxide in amounts sufficient to check the growth of the germs.

Among the points offered in proof of this theory of how sulfanilamide works to cure disease, the three research men point out that sulfanilamide is more effective in killing the germs in spinal fluid, which has little catalase, than in "catalase-laden blood."

*Science News Letter, January 14, 1939*

## AERONAUTICS

**Earth Inductor Compass For Ordinary Planes**

**D**EVELOPMENT of an earth inductor compass of a type usable for the first time on ordinary airplanes and boats has been announced by the Washington Institute of Technology.

Though the earth inductor compass, which uses the principle of a coil rotating in the earth's magnetic field to tell direction, was first developed as long ago as 1921 and was used by Col. Charles A. Lindbergh and others in their history-making long distance flights, previous types never made the grade in regular flying.

Their former defect, inability to recover quickly enough during the execution of air maneuvers, has, however, been very nearly overcome in the new type, the Washington Institute states.

Formerly suitable only in the case of long, straight flights by heavily loaded aircraft such as Col. Lindbergh's Spirit of St. Louis on its transatlantic journey, the new compass returns to a proper reading less than half a second after pitching, rolling, banking and in bumpy air.

Advantages claimed over the ordinary magnetic compass are the fact that it does not spin wildly as does the magnetic compass; and it does not require frequent setting, as does the gyro compass.

*Science News Letter, January 14, 1939*

**IN SCIENCE**

## PUBLIC HEALTH

**Health Hazards On The White Collar Job**

**H**EALTH hazards at work are not limited to jobs in factories, mines, quarries and the like. The white collar worker has his own set of health hazards. Among them are lack of exercise, poor eating habits, bad ventilation, bad lighting, and tension from responsibility.

These apparently take their toll. Vital statistics show that the office worker is not so healthy as machinists and toolmakers and not nearly so healthy as carpenters.

It is up to the employer to provide good working conditions for employees, whether in factories or offices, but the worker must look out after his own diet and exercise.

White collar workers do not get nearly all the exercise they need while on the job, because except for some types of saleswork they hardly move about at all.

Devoting the weekend to strenuous sports is not the way to make up for this, medical authorities agree. It is considered much better to spread the exercise out over the whole week. A short walk each morning or evening may not be much fun, but it is good for one's health.

"The diet of the office worker is very important," Dr. John A. McDonald of the Baltimore City Health Department has recently pointed out in a discussion of white collar job health hazards. "We are apt to think that because people do not do hard physical labor they do not require much food. Whether the body is at work or at rest, it always requires food."

"If you are a white collar worker you need nourishing food to sustain you in your mental activities and you should never go to work without a breakfast containing at least some fruit, some cereal or an egg and maybe some milk."

A good breakfast and a light lunch is better than a skimpy breakfast and a heavy lunch, but a lettuce sandwich or a bowl of soup is not an adequate lunch. The day's heaviest meal should come after the day's work is done and the tension of the job is relaxed.

*Science News Letter, January 14, 1939*

# NE FIELDS

MEDICINE

## Women With Cancer Seek Medical Aid Earlier

A BRIGHT spot in the cancer picture appears in a statement issued by Dr. C. C. Little, managing director of the American Society for the Control of Cancer.

Women with symptoms that may mean cancer of the breast are seeking medical aid earlier than they did five years ago. This probably means that a correspondingly greater number of lives are being saved, since between 70 and 80 per cent. of breast cancers can be cured by early diagnosis and treatment.

"It is gratifying to note," Dr. Little said, "that last year in two large hospitals in New York state, 31 per cent. and 44 per cent. of the cases of cancer of the breast were early; in a Michigan hospital, 39 per cent. were early; in an Iowa hospital, 40 per cent. were early; in an Illinois hospital, 30 per cent. were early. In each instance, this was a distinct improvement over the figures for 1933."

Medical organizations, health departments, the Women's Field Army of the American Society for the Control of Cancer and press and radio are credited with contributing to the education of people in recognizing the importance of early symptoms that may mean cancer.

*Science News Letter, January 14, 1939*

PSYCHIATRY

## Mental Diseases Linked With Type of Neighborhood

PUSHING pins into a map is a fascinating activity and one that sometimes has very illuminating results.

In an "ecological" study of the city of Chicago, this sort of technique has been applied to a very new field—that of mental disease. A link was found between the neighborhood you live in and the particular type of mental disease you may later develop.

Cases of paranoid schizophrenia are dotted close in the rooming-house districts of the city, the study revealed to Dr. Robert E. L. Faris, of McGill University, and Dr. H. Warren Dunham, of the Illinois State Psychopathic Institute

and the University of Chicago, who have published their findings in the book, *Mental Disorders in Urban Areas* (University of Chicago Press).

By contrast, manic-depressive psychoses are likely to occur in areas with higher rentals although the pattern of "pins" in this case is very irregular.

Catatonic schizophrenia is most frequent in neighborhoods of foreign-born or Negro immigrants. The alcoholic psychoses are most common in rooming-house and in certain immigrant areas.

General paralysis occurs mostly in the "Hobohemia" of lodging and rooming houses and in Negro communities.

But senile psychoses and the mental illness of old age and arteriosclerosis come to hospitals from districts with the lowest percentages of home owners.

The authors have a theory to propose about the link between community and individual mental diseases.

Life itself for humans, they point out, is dependent upon close association with other humans. Little children need more than physical care. They must be taught the language and folkways of their society or mental development cannot proceed as it should. They must also receive affection and be intimate enough with someone to communicate their thoughts freely or they will become isolated and in such isolation will grow to be "queer."

In Hobohemia, where men come and go as transients, where family life is rare, and where all are strangers with ways unknown and incomprehensible to each other, there the mental disease of "inaccessibility," schizophrenia, abounds.

*Science News Letter, January 14, 1939*

ZOOLOGY

## "Average Animal" Honors Go To Lowly Sea Worm

IF A POLL were to be taken among scientists, to determine what is an "average animal," the distinction would fall not to man or monkey, dog or cat, but to a lowly sea worm, kin to the common angleworm but having a few more "trimmings." Such is the opinion expressed in a new book, "Animals Without Backbones," by Ralph Buchsbaum (University of Chicago Press).

Invertebrates, or backboneless animals, far outnumber the larger and more familiar backboned forms, of which the human species is one member. The invertebrates constitute 95 per cent. of all known animal species. And the sea worm known as *Nereis* is close to a "typical" representative of that group.

*Science News Letter, January 14, 1939*

RADIO

## Radio Amateurs Start Under New Regulations

RADIO amateurs the world over started operating on New Year's Day under new amateur radio regulations drafted at the Cairo (Egypt) Conference on radio broadcasting last year.

Least affected among the world's "hams," American operators have only to note certain changes in signals, the American Radio Relay League pointed out. Many waveband changes go into effect, but they affect operators in other countries only.

*Science News Letter, January 14, 1939*

BIOLOGY

## Scientist Controls Sex Of One Type of Bullfrog

SEX can be determined as male or female at the will of the experimenter, in tadpoles of a race of bullfrogs, by the injection of hormones or gland products, Dr. William O. Puckett of Princeton University demonstrated before the American Society of Zoologists.

If his method could be extended to the human species it would be welcomed by millions of prospective parents who would like to settle the boy-or-girl question in advance. Perhaps, however, it is fortunate that it cannot be used at present—it might be misdirected to the production of a larger supply of cannon-fodder, in certain parts of this uneasy world.

So far as the bullfrogs are concerned, the method works a hundred per cent., Dr. Puckett stated. He showed sectioned specimens of the reproductive glands of very young tadpoles. They were neither male nor female, but were capable of becoming either. Normally they make the turn one way or the other at about the end of their first tadpole year, and the population works out the usual fifty-fifty ratio between the sexes.

If extract of the pituitary gland, a small organ situated near the brain, is injected into tadpoles less than a year old, their reproductive glands are rushed to maturity before their time, but the sex ratio still remains at the old half-and-half figure. But when the female hormone, theelin, or the male hormone, testosterone, is injected along with the pituitary extract, all the tadpoles develop as females or males, respectively. Cross sections of their reproductive glands leave no question as to the definiteness of the sex determination.

*Science News Letter, January 14, 1939*

## PSYCHOLOGY

# "Bewitched" Virginia Child Is Found to be Normal

## Scientists Travelling to Mountain Home Find Simple Explanation of Bouncing Bed and "Scratchings"

By ALEX BRETT, Ph.D and  
GEORGE M. HASLERUD, Ph.D

University of Tennessee Psychology Department, Knoxville, Tenn.

**Editor's Note:** This is the report of the scientific investigation of the famous "bouncing bed" child made under the auspices of Science Service.

PRESS and radio reports of a bewitched child bouncing in bed, beds jumping up from floor, chairs moving alone, ghost hands and mysterious vanishing things have recently come from Jonesville, Lee County, Virginia. This is the rugged region of the Daniel Boone trail, trail of the lonesome pine, the Wise murder trial, isolated mountain folk, and popularly supposed place where superstitions flourish and anything can happen. The first newspaper and verbal accounts confirmed this popular fancy. Investigation by us on the ground proved the alleged occurrences grossly exaggerated.

### Checking Testimony

Direct questioning of numerous individuals who themselves had observed the alleged phenomena at first hand showed many important discrepancies from published accounts. With a few exceptions the testimony of the majority ran as follows:

The bed at no time left the floor: only the mattress shakes or bounces. Most of them had heard scratchings resembling finger nails on wood and patting noises like striking the flat of the hand on cloth. Many said that nothing had happened the nights they were present except quite ordinary movements of a child in bed. Some added what they had been told by the child's family and certain neighbors. They said a month ago 71-year-old Rebecca Sybert noticed peculiar things happened to the pillow on which slept her granddaughter, Bertha Sybert, aged nine. The two were living alone and slept in the same bed and the pillow would begin bouncing and emit patting noises. Also there were scratches which she thought came from a rat.

Later the bouncing spread to center and foot of the bed. Moreover, one evening a chair on which the girl was sitting became agitated and moved backward some four feet.

The more exceptional testimony of a small minority was in no case as remarkable as the newspaper accounts. They simply emphasized a greater amplitude of the bouncing movements. One neighbor and the child herself were the only two who claimed to have seen ghostly objects moving about the bed. The family wanted it understood that the manifestations were supernatural.

### Preliminary Observations

On the morning of Dec. 22, accompanied by a newspaper reporter, we climbed to the time-worn 3-room cabin, high on the slopes of Powell Mountain. We found it occupied by the grandmother, the mother, the remarkable child, Bertha, and her three small brothers and sisters. The father was not home. The family at first showed resentment toward the reporter who endeavored to take pictures of the interior and the principals (they had been photographed enough, it was said). The grandmother, however, related to us the essentials of the phenomena. Her story in no way deviated from the majority report stated above except in indicating the supernatural character of the events. She reported these happenings invariably would begin at dusk (5 p. m. Central Standard Time) and continue intermittently from one-half to two hours.

Bertha is a lively child, attractive and normal in every respect. Her responses to the Woodworth-Wells association test indicated no psychological abnormality and suggested an intelligence approximately one year above her chronological age. Interview with Bertha's teacher later in the day reinforced our conclusions about the child's normality.

Late afternoon without a reporter we returned to the cabin. The father received us cordially and the rest of the family were friendlier than in the morning, particularly after a gift of fruit and

gum. The father almost at once offered to have Bertha exhibit her "powers." The grandmother objected "hit hain't never appeared before 5." We expressed no hurry. However, arrival of other visitors made us anxious to begin observations before it was too crowded. The room is approximately 12 by 15 feet. The furnishings consist of a sideshelf, a fireplace, several chairs, and three beds, one wooden double and two single. It was now dark except for the feeble light from a small kerosene lamp in the far corner from the bed and whatever glow came from the fireplace. The exhibition bed was in the darkest corner of the room. Dr. B. moved the bed away from the walls so that we could observe from either side.

### Alert and Happy

Bertha was called by her father to an adjoining room and the door closed. After a couple minutes the two re-entered with the child fully clothed except for shoes, as before. She jumped into bed and crept under three layers of covers. She kept her hands usually in full view close to her face. Almost immediately she began bouncing, alert and in good spirits, and from time to time "popping" her chewing gum. Dr. B. felt so certain that she was merely getting settled in bed for the strange performance that he remarked, "When is it going to begin?" She and her father replied, "It's started already."

We first permitted unrestricted exhibition. The mattress swayed up and down with her body and the springs squeaked. Her extremities showed little movement. The motion seemed to originate in the pelvic region. When the movement stopped after a minute or two, the father exhorted, "Bertha, talk to hit. Tell hit to bounce good." She repeated the latter part of the phrase literally as she did with other suggestions to the "booger" whether from the father or others present. The excursions of the mattress increased. Then we began our control tests. Whether we placed hands above or below the covers, the movement stopped as soon as they approached her body. However, with quick placements, Dr. B. immediately after the more violent movements found noticeable contractions of stomach and posterior thigh muscles. Movements of bed and body also ceased if her attention was distracted by a question or command or childish desire for gum or fruit. Evidently the phenomenon required undivided attention on her part.

This necessity for attention was also observed by others than Dr. B. and Dr. H.

Dr. H. inquired of Bertha what she thought was making her bounce. Among other things she answered, "it might be a witch." When asked what a witch looks like, she said, "Hit's kinder like a shadder. It rides on a broom in the sky," and volunteered to show a picture of one. She jumped out of bed and displayed a small silhouette of a witch on a broom, one of the numerous figures on a page of her brother's first reader.

This intermission gave Dr. B. and others opportunity to examine the bed thoroughly. The bedspring is a dilapidated one of very weak coil construction with broken springs protruding and rubbing against the footboard. These wires had already made several deep scratches. When the mattress was agitated by hand, the springs squeaked all over and made scratching noises.

When Bertha was ordered by her father back to bed for further demonstrations, the room was badly crowded with approximately forty people. Dr. B. observed the reactions of visitors while Dr. H. talked with the family. Despite the efforts of the family to emphasize the supernatural nature of the evening's performance, only a minority of the visitors' comments indicated acceptance of the proffered explanation. The majority voiced skepticism, were cynical or amused.

#### No Remedies Used

The mother while claiming to be anxious to get rid of the "booger," had not used any of the several local "remedies" against witchcraft except putting a Bible under the girl's pillow. This had no effect. They had not even resorted to prayer.

The grandmother and one of her sons, other than the father of the family, were irritated because of the presence of the many unbelievers in such a large crowd and claimed it inhibited Bertha. The father from time to time suggested that those who had seen ought to leave and make room for others.

After an hour a neighbor to whose home the child had been removed the previous evening for special trial to see if the "hant" would follow to other localities and who had found special reactions of it to music, entered with his guitar. Seated beside the bed, he played his instrument and exhorted Bertha to further manifestation of her "powers." We observed renewed vigor of movements in time with the plucking of the guitar. The father and his neighbor

called attention to squeakings which this time appeared to come from the head panels of the bed. Dr. B. found the squeakings ceased when he pressed firmly against the thin, loose panels and resumed when he released the boards.

#### Conclusions

The above account of the Virginia "bewitched" child is complete enough for our present purpose. Many details were recorded but are not reported here. We entered the investigation with an elaborate plan of controls for accomplices, sleight of hand, and other possibilities. We were amazed at the simplicity of the entire performance and the obvious, natural explanation.

We have no doubt that the child makes conscious, deliberate contractions of the buttocks which explains the peculiar swaying of the mattress. The movements can be duplicated easily. The squeakings and scratching are the result of the dilapidated condition of the spring and bedstead. The moving of the chair with both feet on the rungs or braces was duplicated by Dr. B. in full sight of the family. The darkness of the room helps to conceal much.

The present phenomena indicate the

following probable trial-and-error development. Evidence points toward accidental discovery on the part of the child of the attention value of scratching the head of the bed and the pillow with her hand on the side of the bed away from her grandmother.

Later she discovered that patting and bouncing the bed is more effective and less likely to be detected. To show that the manifestations are yet in process of gradual development, we were told by the family of new special movements of the foot region "like rooting of a hog" and complaints that the "hant" is pulling her hair.

The evidence reported here and some further observations suggest striking analogy with the development of the celebrated Fox sisters of spiritualistic notoriety. The spread of the present nation-wide fascination by the case which has assumed headline proportions, is interesting. The first innocent pranks of Bertha found their way into the newspaper of a neighboring town in an article by a local contributor. This story was mentioned by several large papers in neighboring states. Reporters were sent for more information and the articles became longer and the headlines



**EXPERIMENTAL DAYLIGHT LAMP**

*Because it has a continuous spectrum like the sun and unlike other materials used in vapor lamps, tellurium vapor is the object of this inquisitive scientist's study. He is Dr. N. C. Beese of the Westinghouse Lamp Division at Bloomfield, N. J.*

larger. Finally Science Service found it necessary to get more critical investigation of the situation. This report is the result.

### Predictions

If the child is further investigated psychologically or physically, no abnormalities will be found. Either the present interest will cease and then the alleged phenomena disappear or even more exaggerated claims will be made to accompany the growing demands.

Lest we perpetuate the notion of a benighted, superstitious people inhabiting this part of the country, let us remind you again of the refusal of the large majority to be hoodwinked. Even many close to the scene did not find it worthwhile to make a visit to the place. The remark of one man seemed to typify the character of the people:

"I'm always interested in new agricultural developments but not in new things of this sort."

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## From Page 20

mon. Dr. Rivers gave the latest news of the viruses in an address before the American Association for the Advancement of Science.

"Some of the viruses," he said, "may be minute, highly parasitic micro-organisms, the midgets of the microbial world, capable of reproduction only within susceptible host cells, others may represent forms of life more or less unfamiliar to us, and still others may be fabrications of their host cells aided by the processes of autocatalysis.

"What life is and where the transition from the non-living to the living takes place, if it does, in the scheme just set forth is not known. Furthermore, the transition may be so gradual that it will be difficult for investigators to assign the particular point at which it occurs."

If Dr. Rivers' view is correct, that the viruses are not all alike, it would after all only describe again a situation quite familiar among the disease germs that can be seen through ordinary microscopes. Some of them are bacteria, some are one-celled animals or protozoa, some are fungi, and some belong to still other classes of microscopic life. "Germs" are also a very much mixed lot.

Yet despite the handicaps which their minute size and often puzzling behavior impose on research, Dr. Rivers stated that a good deal has already been found out about them, and that a small army of research workers is hard after them

to wrest away still more of their secrets.

We have a pretty good idea of the sizes of some of them, he said; they range from almost the size of some of the smaller bacteria down to that of single protein molecules. We can also infer that at least three shapes are found among them: round, oval and rod-like. We know that they commonly have the same kind of electrical charges found on protein molecules.

With his co-workers, Dr. Rivers has made a special study of the vaccine virus, which is the virus of cowpox used in vaccinating against smallpox. They worked out a new method of producing it in quantities large enough to handle by laboratory methods, and thus got a good supply to study.

Among other studies was a direct chemical analysis of purified elementary bodies of this virus, that is, of the tiny units that actually produce the biological results of vaccination. The dried elementary bodies were found to contain 83.12 per cent. protein, 8.54 per cent. fat, 0.72 per cent. ash, 5.56 per cent. residual moisture, 2.06 unidentified material, including a trace of carbohydrate.

"These analyses," Dr. Rivers stated, "do not differ materially from those recorded for bacteria or for protoplasm."

Objective of all this research, Dr. Rivers declared, is control of the diseases of man, animals and plants caused by the viruses. In part, this has already been achieved, as in the case of human smallpox, encephalitis of horses, etc. But other terrible scourges remain still unconquered, like infantile paralysis and such crop-destroying plagues as plant mosaics.

To get the better of these it is first necessary to understand them, and to understand them it is necessary to continue intensive research.

### "Good Old Days" a Fallacy

THE IDEA that life was healthier in the days before civilization is a fallacy, studies of the bones of aboriginal American Indians show.

"In fact," said Prof. W. M. Krogman, of the University of Chicago, in reporting the studies, "the 'good old days' of 'natural life' and 'freedom from illness' just weren't."

"In addition the aborigines averaged about 35 years of mortality—the life span had been run by the mid-fourth decade."

Mastoid infections, osteomyelitis, osteosarcoma or cancer of the bone, osteitis fibrosa, multiple myeloma, arterioscle-

rosis or hardening of the arteries, and kidney and bladder stones are among the conditions which all afflicted the aboriginal Americans as they do modern Americans. Evidences of these diseases have been found in examinations of the bones of the first Americans.

The most frequently found sign of disease is in the skull, where bone has been cut away to relieve a compressed fracture caused by war clubs. This was especially frequent among the Incas of Peru. The right side of the skull was most frequently cut open, the surgical tools being flakes of flint or obsidian used to saw, scrape and cut the bone away.

Cases of five successful healed operations of this type have been found, Prof. Krogman said.

Fractures were fairly common, splinting was known but not often used. When the fracture healed, the affected arm or leg was usually shorter than its mate. Evidence of amputations and artificial peg-legs was also found among Inca bones.

Skulls of Inca, Maya and Aztec show a tendency to a condition which may be similar to rickets or at least to some deficiency of vitamins or minerals.

The question of whether syphilis occurred first in the New World or the Old World cannot be settled on the bones alone, Prof. Krogman declared. There are six sites in the New World, he said, where skulls and long bones of Indians that lived before Columbus arrived on these shores look very much like syphilitic cases.

### People On Mars?

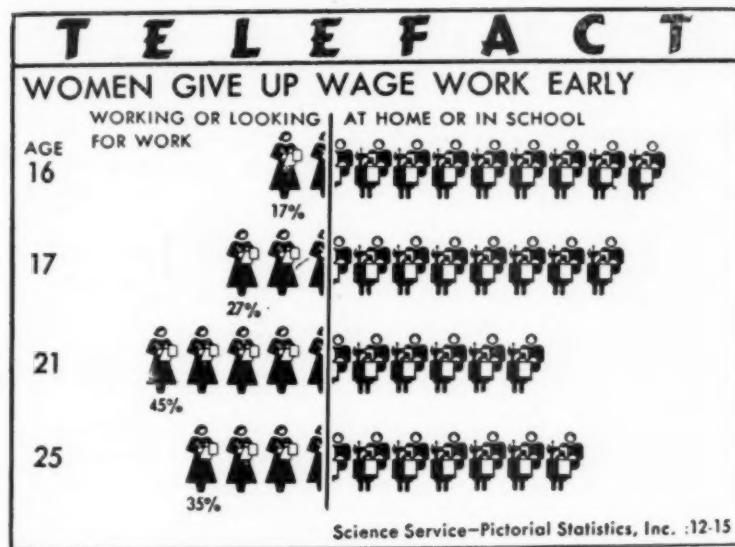
ARE there people on Mars?" is a question that over half the boys and girls in typical junior high schools, interviewed by Herbert S. Zim, of Ethical Culture Schools, New York City, are wondering about.

While boys and girls do about the same amount of wondering about scientific matters, Mr. Zim found that curiosity of the girls does not lead to action as often as it does in the case of boys. The boys participated in scientific activities about five times as often as girls.

Whether or not the students have a definite interest in science, they seem to be curious about the same things.

*Science News Letter, January 14, 1939*

Ranger naturalists in California say that deer are not voiceless—young fawns and yearlings moan audibly when separated from their fellows.



## PSYCHIATRY

## Should Not Ask Psychiatry To Shape World History

**Dr. Zilboorg Disagrees With Those Who Would Use Medicine to Control Man's Destructive Impulses**

THE present popular idea that psychiatry can be used to create "super-individuals," to wipe out hatred, and to shape history according to modern ideals is all wrong, in the opinion of Dr. Gregory Zilboorg, New York psychiatrist.

Dr. Zilboorg took exception to certain ideas on political psychiatry expressed at the symposium on mental health during the Richmond meeting of the American Association for the Advancement of Science (See SNL, Jan. 7).

The idea of political psychiatry seems, Dr. Zilboorg said, "to be born out of the confusion between the individual's inter-personal relationships and social dynamics."

For example, Dr. Zilboorg quoted one authority who said that "psychiatry is the general science of understanding and controlling the destructive impulses of man."

"Yet we know clinically," Dr. Zilboorg pointed out, "that full control of one's destructive impulses leads not infrequently to depressive states of pathological inactivity."

On the subject of aggression, frequently blamed for many of the world's troubles, Dr. Zilboorg said that while

a "free, uninhibited flow of aggression would obviously lead to murder," a complete blocking of aggression, "will naturally lead to severe depression and suicide, or to a complete withdrawal from life." This withdrawal may take the form of a stupor such as is seen in patients suffering from catatonic schizophrenia, or may appear as such extreme irritability as described by the terms "raving maniac" or "dangerously insane."

Hatred, that "despised element of human nature," is, Dr. Zilboorg said, "a valuable component of our life."

"It makes us and breaks us, but its extirpation, if it were possible, would extirpate us too."

Psychiatry's proper place, Dr. Zilboorg pointed out, is as a branch of medicine and its proper use is for the treatment and aid of individuals. Any attempt to use it as a tool for shaping history will lead to subjugation of psychiatry to history.

The "dazzling halo of confusion" surrounding psychiatry and the grand things now asked of it are due to the mistake, Dr. Zilboorg said, of thinking that ideas are forces and that a proper

communication of ideas is equivalent to a corresponding awakening of forces.

"Ideas are not movers of instinctual forces but rather their representatives," he declared.

Consequently he does not believe ideas can be expected to promote mental health. This is not as pessimistic as it sounds, he pointed out.

"It would seem that the promotion of mental health on a large scale offers some promise of success, for the present at least, not in the field of intellectual propaganda, political reorganization or economic reconstruction, but elsewhere.

"Psychiatry in the true sense of the word is hardly 50 years old," Dr. Zilboorg pointed out, "and, for the time being at least, it seems that the treatment of the greatest number of individuals in the greatest number of clinics by the greatest number of competent psychiatrists is the only safe recommendation one can make without the feeling that one sacrifices one's scientific discipline to speculative construction."

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## MEDICINE

### Warn of Danger in Use of Sulfanilamide Compound

A WARNING that one of the new sulfanilamide compounds, which has been reported as a particularly effective remedy for pneumonia as well as other germ diseases, may be dangerous has been issued by three Baltimore scientists, Drs. E. K. Marshall, Jr., A. C. Bratton and J. T. Litchfield, Jr., of the Johns Hopkins University.

The new drug, which is sulfanilamidopyridine, appears to be more toxic than sulfanilamide itself, the Baltimore scientists report to the technical journal, *Science*. Their findings are based on the comparison of the effects of equal concentrations in the blood of sulfanilamide and the newer compound related to it.

When the new drug is given by mouth, it is not very well absorbed by the body and its lack of poisonous effect reported by those who have used it to treat pneumonia may be due to the fact that not very much of it gets into the blood. If the new drug is combined with sodium (ingredient of common salt) it becomes more soluble and is more readily absorbed from the stomach and digestive tract.

"Until more is known about the drug, it should not be used in conditions where sulfanilamide has been shown to be effective," the Baltimore scientists declare.

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## PSYCHIATRY

# Poison Acting in Cells May Cause Schizophrenia

**Discoverer of Insulin Shock Treatment Says Toxin May Act Directly or Indirectly Through Midbrain**

**U**RGING early treatment of psychic illness, to avoid institutional care and severity of the convulsive shock treatment he himself introduced to medical science, Dr. Manfred Sakel, Viennese psychiatrist, told the Association for Research in Nervous and Mental Disease his theory as to how the brain becomes disordered.

The cause of schizophrenia, serious malady of split personality which he treats by shock, is still unknown, Dr. Sakel reported. But he believes it may be attributed to some poison acting in cells of the higher brain centers. The poison may attack either directly, or else indirectly, by disturbing the control apparatus in the midbrain where primitive and automatic functions of the brain reside.

In early stages the affected brain cells are merely disfunctioning when the human being shows signs of unbalance, but if the condition becomes deeply rooted, then damage sets in, he explained.

## Asthma Psychological

**S**TUDY of one hundred cases of asthma which offer evidence that this disease has an emotional origin in childhood was reported by Dr. Felix Deutsch, who has been engaged in research for three years at Harvard and at Boston hospitals. Not ignoring allergic features of asthma attacks, Dr. Deutsch is convinced that this disease must be treated

psychologically when it does not respond to medical care only.

Asthma is one of several diseases cited in which body and mind appear inextricably involved. His explanation is that childish tantrums, rebellion against over aggressive maternalism or other conflicts may become linked with conditions in the respiratory tract or some other organ and later in life the physical attack of disease may be evoked when an outer stimulus stirs up the old emotional state.

## Marihuana Gives Some a Jag

**E**VIDENCE that marihuana, drug taken in cigarette form, affects people differently, leading some into a jag state of pleasure and others into an excited fright which may end in insanity, is reported by Dr. Walter Bromberg, physician in charge of the psychiatric clinic at the Court of General Sessions of New York.

Thirty-two cases of mental disease traceable to marihuana were described by Dr. Bromberg, speaking before the Association for Research in Nervous and Mental Disease. The drug, he said, does not lead to any one particular type of mental illness. Rather, its effects tend to push certain users toward whatever unbalance of mind or emotions their own make-up is liable.

Citing ways in which the drug affects mind and body, Dr. Bromberg told of users being confused, deluded into a feeling of their tremendous brilliance, lost

in time so that minutes seem hours, believing their hands and feet have become huge, and that a small downward step is a great plunge. The majority become exhilarated and may laugh uncontrollably. A smaller percentage go into the more dangerous frightened state.

Science News Letter, January 14, 1939

## POPULATION

## More Childless Marriages; Fewer Large Families

**O**NLY three out of every eight families in the United States today are contributing to America's population growth by having three or more children, P. K. Whelpton of the Central Statistical Board, a Federal agency charged with correlating government statistical studies, and Nellie E. Jackson, of the Scripps Foundation for Research in Population Problems, informed the American Statistical Association.

Childless marriages have increased to one out of every five marriages, they declared on the basis of birth rate studies.

Marriages resulting in five or more births are outnumbered four to one by all other marriages, but they contribute more than three-fourths of all our population growth.

The proportion of childless marriages has been increasing, their studies show. It was almost twice as high, according to birth rates for 1929-31 as it was ten years previously. In addition the proportion of married couples who could have four, five, six or other large number of births declined by between 25 and 40 per cent. during the same period.

Science News Letter, January 14, 1939

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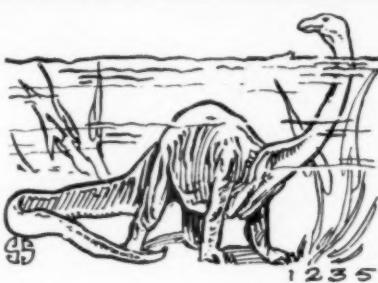
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#### Question of Support

**B**RONTOSAURS and their ponderous kin-reptiles were the biggest animals that ever lived, with the sole exception of modern whales. They were easily the biggest beasts that ever walked on legs. They reached lengths of 70 or 80 feet—what with their tremendously long necks and interminable trailing tails—and they probably weighed 50 or 60 tons apiece.

That enormous bulk of body is what makes them such a puzzle to scientists. How did even their big-boned legs support it?

It isn't likely that they squattered along on their bellies, like present-day alligators and lizards. The position of their leg-joints doesn't indicate sprawled-legged locomotion, and anyway, it would probably have been an impossible job dragging such bodies over the ground. Those tremendous tummies just presented too much brake surface.

For a fully upright position their legs, pillar-like as they are in their bony structures, don't seem quite reasonable, either. A weight of 50 or 60 tons is a lot for any set of pillars to support, particularly if they have to move it about. And move about, of course, is what the great saurians had to do, just as cattle and horses do today. The brontosaurs and their relatives were all vegetarians, and although their long necks would enable them to stand (or squat) still and clear all the vegetation from a 60-foot circle, they would have to move on pretty frequently, because it must have taken super-elephantine quantities of fodder to stoke their cavernous insides.

One suggested solution for the dinosaur's freight problem is that they were animals of shallow lakes and deep marshes. The whales can live because

their immense bodies are buoyed up by the water. Why not put the dinosaurs on the bottom with only their heads and maybe the tops of their backs sticking out above the surface, and let them browse on the lush vegetation in the shallow water and overhanging the banks?

That sounds reasonable enough. The suggestion moreover receives considerable support from the discovery of a big saurian skull with the nostrils away up at the top of the head, just where they should be to enable the animal to

breathe while feeding with its mouth submerged.

This does not necessarily mean, of course, that the big reptiles never come ashore. Modern alligators and crocodiles make considerable overland journeys from one lake to another, and hippopotamuses are dreadful nuisances to African farmers several miles from the nearest "hippo" haunts. So maybe the saurians lived at ease in the ooze most of the time, and waddled ashore when the whim seized them.

*Science News Letter, January 14, 1939*

#### GEOLOGY

## Bruised Cow Mute Witness Of Fall of Meteorite

### Is Apparently Only Instance of Living Creature Injured by "Falling Star"; Several Fragments Found

**S**TONES have hit cows probably millions of times, flung from the fists of bad little boys; but a stone that fell near Chicora, Pa., seems to have been the only missile that has ever hurtled down from the blue sky to bruise a poor Bossy into a bellow of indignation.

The story was told by a Pennsylvania scientist who has a modesty so ingrowing that he won't permit his name to be mentioned, when he brought two stony meteorite fragments to the Smithsonian Institution for petrographic analysis.

One stone, about the size of a man's fist, was found in the chicken-yard of a Chicora farmstead. The farmer, sitting on his porch at the end of the day's work, heard what he took to be an airplane overhead, and at the same time a mighty uproar among his hens. Next day he found the stone.

A little distance away he found a second, similar stone. Also, one of his cows had an unaccountable wound, which had to be treated by a veterinarian. Since she can't talk, she couldn't accuse a strange piece of rock of hurting her. But scientists have their strong suspicions.

At any rate, the farmer can count himself lucky, for the two stones are undoubtedly meteoritic, and probably represent fragments of a bigger mass that burst overhead after a fiery transit through the earth's atmosphere. Meteoritic bombing from outer space is not to be taken lightly.

The scientist who won't tell his name started a bit of celestial detective work.

With the aid of an artillery officer to calculate angles, he quizzed everybody he could find who had seen the fiery projectile tear through the heavens.

Time was an important factor in his calculations, but unfortunately very few of the witnesses had glanced at their watches—they had been too excited. However, many of them were farmers, who were sitting listening to their radios when the strange visitor swept over the horizon, and they remembered what programs they had been enjoying. (Long before Orson Welles scared us with Martian meteorites!) This permitted a fairly close time-check.

Finally the scientist was able to calculate the point of fall with considerable accuracy. He located the Chicora farmer, induced him to part with his sky-stones for the sake of science, and sent them to the Smithsonian where there is proper apparatus to prepare them for analysis. He still hopes to locate other pieces of the exploded meteorite. It is quite possible, for example, that the injury to the cow was caused by a third fragment, still unfound.

Although the Cow of Chicora seems to be the only living creature who can lay claim to the distinction of having been hit by a stone flung from the sky, there are cases on record where houses, barns, and other structures have been struck by meteorites. There is no well authenticated case, however, of injury to a human being from that cause.

*Science News Letter, January 14, 1939*

# \*First Glances at New Books

## Medicine

MEDICINE IN MODERN SOCIETY—David Riesman—Princeton Univ., 226 p., \$2.50. Here is a book that could well be put on the "must read" list of every intelligent layman. Medical history; simply written explanations of causes, treatments and prevention of diseases; descriptions of the physician's education, his job and his philosophy; and a discussion of the problem of providing medical care—all these are blended into a highly readable thought-provoking book which not only provides much useful information but also really does give, as its title implies, a picture of the place of medicine in modern society.

*Science News Letter, January 14, 1939*

## Zoology

FIELD GUIDE TO NEW ENGLAND TURTLES—Harold L. Babcock—Boston Society of Natural History, 56 p., illus., \$1. In addition to descriptions and field notes, the habits of the turtles relative to their tamability are discussed. There are nine colored plates.

*Science News Letter, January 14, 1939*

## Psychology

PSYCHOLOGY OF CHILD BEHAVIOR—Arne S. Jensen—Prentice-Hall, 664 p., \$3.85. This is a textbook by the associate professor of psychology at Oregon Normal School. The author has avoided isms and has freely drawn from other sciences in an effort to give a picture of the whole child without introduction of controversial matters.

*Science News Letter, January 14, 1939*

## Zoology

ANIMALS WITHOUT BACKBONES; AN INTRODUCTION TO THE INVERTEBRATES—Ralph Buchsbaum—Univ. of Chicago Press, 371 p., \$5. See page 25.

*Science News Letter, January 14, 1939*

## Psychiatry—Sociology

MENTAL DISORDERS IN URBAN AREAS—Robert E. L. Faris and H. Warren Dunham—Univ. of Chic., 270 p., \$2.50. See page 25.

*Science News Letter, January 14, 1939*

## Chemistry

THE OXIDATION STATES OF THE ELEMENTS AND THEIR POTENTIALS IN AQUEOUS SOLUTIONS—Wendell M. Latimer—Prentice-Hall, 352 p., \$3. This text, treating the energies of the elements in their various oxidation states, requires little elementary knowledge of thermodynamics. In quite the same way, it is not necessary to know practical survey-

ing to determine the relative heights of two mountains when one can refer to suitable published tables. The author uses this point of view to provide a book of interest to chemists rather than to those who would delve deeply into thermodynamics.

*Science News Letter, January 14, 1939*

## Engineering

MILLIONS ON WHEELS; HOW TO BUY, DRIVE, AND SAVE MONEY ON YOUR AUTOMOBILE—Dewey H. Palmer and Lawrence E. Crooks—Vanguard, 308 p., \$2.50. A representative of Consumers Union and an automotive engineer collaborate in an analysis of how automobiles are built: the limitations under which the manufacturer operates, such as the necessity to divert much of the development into readily salable items. They name names, pointing to what they think are good, bad and indifferent features.

*Science News Letter, January 14, 1939*

## Anthropology

THE PEOPLING OF VIRGINIA—R. Bennett Bean—Chapman & Grimes, 302 p., \$3. The anthropology of a state is a rather new book subject, but it may be expected that many states will now be studied in similar fashion. Dr. Bean gives facts about past and present Virginians, their nationalities, types, where they settled, and what Virginians are like in physical traits today.

*Science News Letter, January 14, 1939*

## Child Study

BABIES ARE HUMAN BEINGS—C. Anderson Aldrich and Mary M. Aldrich—Macmillan, 128 p., \$1.75. An attractive and readable book on infant development intended for parents. The authors are a baby doctor and his wife.

*Science News Letter, January 14, 1939*

## Psychology—Physiology

PRINCIPLES AND PRACTICES OF SPEECH CORRECTION—James F. Bender and Victor M. Kleinfeld—Pitman Pub. Corp., 298 p., \$2.25. Intended for teachers of speech correction.

*Science News Letter, January 14, 1939*

## Sociology

WE ARE FORTY AND WE DID GET JOBS—C. B. Thompson and M. L. Wise—Lippincott, 260 p., \$1.47. Very personal counsel to those who are looking for jobs, from two women who were a success at that sometimes soul-wearing occupation.

*Science News Letter, January 14, 1939*

## Biography

LEONARDO DA VINCI—Antonina Valentin; trans. by E. W. Dickes—Viking Press, 561 p., illus., \$3.75. So many geniuses were compounded in the person of Leonardo that artists, scientists, physicians, architects and those in many other walks of life will read this biography with almost personal interest. Subtitled "The Tragic Pursuit of Perfection," it is the story of a man ahead of his age, almost at times ahead of even the present.

*Science News Letter, January 14, 1939*

## Aviation

AIR NAVIGATION (2d. ed.)—P. V. H. Weems—McGraw-Hill, 587 p., \$5.

*Science News Letter, January 14, 1939*

## Archaeology

THE ANNUAL OF THE AMERICAN SCHOOLS OF ORIENTAL RESEARCH, VOL. XVII for 1936-37—Miller Burrows and E. A. Speiser, eds.—American Schools of Oriental Research, 141 p., plates, \$2.50. Results of four seasons' work at Tell Beit Mirsim, tentatively identified with the Biblical Kirjath-sepher, are continued by Prof. W. F. Albright in this volume. Discoveries in the succession of Bronze Age settlements are described.

*Science News Letter, January 14, 1939*

## Archaeology

THE CULTS OF LANUVIUM—A. E. Gordon—Univ. of California, 58 p., 35 c. Discussion of Roman gods and religious rites at a town near Rome, with special attention to the worship of Juno Sospita and the serpent festival.

*Science News Letter, January 14, 1939*

## Sociology

SOCIAL ECOLOGY—Milla Aissa Alihan—Columbia Univ. Press, 267 p., \$2.75. With a deepening realization that constant reaction is taking place between man and his environment, interest in human ecology is increasing. This volume is intended to give a bird's eye view of researches in this field with a critical analysis of them.

*Science News Letter, January 14, 1939*

## Agriculture

BEHOLD OUR LAND—Russell Lord—Houghton Mifflin, 310 p., \$3. The author of this book draws a frank yet not alarmist picture of the erosion situation against a background of land settlement history, and tells what is being done about it and what yet needs to be done.

*Science News Letter, January 14, 1939*